WHAT IS CLAIMED IS:

1. A bond strength tester for determining certain bond strength parameters of a bonded component, comprising:

an ultrasonic phaselocker;

an ultrasonic transducer;

a loading device that is capable of applying stress-loads to the bond;

a controller for controlling the loading device;

a data recording device to acquire data; and

a computer device to analyze data calculating certain bond strength parameters.

2. The bond strength tester of claim 1, wherein the phaselocker is a pulsed-phase-locked loop.

3. The bond strength tester of claim 1, wherein the phaselocker is a transmission/reflection oscillator ultrasonic spectrometer.

4. The bond strength tester of claim 1, wherein the phaselocker is coupled to the bonded component via the ultrasonic transducer.

5. The bond strength tester of claim 1, wherein the bond strength tester is capable of altering a temperature of the bond.

6. A bond strength tester for determining certain bond strength parameters of a bonded component, comprising:

a force reactor capable of being attached to at least a portion of the bonded component;

a stressor capable of applying a force to the bonded component;

a coupler, wherein the coupler couples the force reactor and the stressor, such that at least the stressor is capable of being actuated and/or manipulated by the controller to apply a force to the bonded component;

a transducer capable of converting electrical signals to acoustic waves and the inverse;

a phaselocker that interfaces with the transducer, via a linked connection, through the input/output interface.

7. The bond strength tester of claim 1, wherein the transducer is capable of generating a compressional or shear wave as a pulse, a tone burst, a continuous wave, or a guided wave.

8. The bond strength tester of claim 1, wherein the transducer includes multiple transducers.

9. The bond strength tester of claim 1, wherein the phaselocker includes at least some of:

an input/output interface;

a data monitoring and acquisition circuit that is capable of monitoring at least some incoming data and/or signal information from the transducer;

a memory that is capable of storing at least some ultrasonic wave propagation data and determination software;

an information database that is capable of data and/or signal processing, generation, interpretation, or analysis information;

a controller coupled to the phaselocker, the input/output interface, the data monitoring and acquisition circuit, the memory, the information database, the display manager, and the display, and configured to be capable of managing reading data from and writing data to the memory, driving and managing the transmission of data and/or signal information to and the reception of data and/or signal information from the transducer, and driving and managing operation of the force reactor and the stressor.

10. The bond strength tester of claim 1, wherein the phaselocker is one of a high-resolution ultrasonic interferometer system, a transmission/reflection

oscillator ultrasonic spectrometer, a phase-locked-loop, or a pulsed-phase-locked-loop ultrasonic spectrometer.

11. The bond strength tester of claim 1, wherein the bond strength tester is capable of altering the temperature of the bond in a prescribed fashion while taking at least some temperature data to determine bond parameters as a function of temperature.

12. The bond strength tester of claim 1, wherein the bond strength tester is capable of altering the temperature of the bond in a prescribed fashion while taking at least some temperature data, load data, ultrasonic data, and ultrasonic frequency data to determine bond parameters as a function of temperature.

13. A method for testing the strength of a bond of a bonded component, comprising:

coupling a phaselocker, via a transducer, to a bonded component to create an ensemble system;

acquiring at least some load data and ultrasonic frequency, initial conditions data for the ensemble system;

applying a load to the bonded component during a load period by placing the bond under tension or compression, thereby applying stress to the bond;

acquiring at least some load data and ultrasonic frequency data from the ensemble system during the load period;

maintaining the load on the bonded component during a load-hold period;

acquiring at least some load data and ultrasonic frequency data from the ensemble system during the load-hold period;

removing the load on the bonded component during an unload period;

acquiring at least some load data and ultrasonic frequency data from the ensemble system during the unload period;

acquiring at least some load data and ultrasonic frequency, final conditions data for the ensemble system after the load on the bonded component has been removed during a relaxation period;

determining a non-linearity parameter (N) from at least some of the acquired data;

determining a hysteresis parameter (H1) for the load-hold period from at least some of the acquired data;

determining a hysteresis parameter (H2) for the unload period from at least some of the acquired data;

determining a plasticity parameter (P) for the relaxation period from at least some of the acquired data; and

assessing the strength of the bond based on the determined parameters, N, H1, H2, and P and determined failure parameters.

14. The method of claim 13, wherein acquiring includes acquiring via a data monitoring and acquisition circuit.

15. The method of claim 13, further including saving at least some of the information and/or data regarding the acquired load data and ultrasonic frequency data and/or at least some of the information and/or data regarding the determined parameters, N, H1, H2, or P to a memory.

16. The method of claim 13, further including transmitting at least some of the information and/or data regarding the acquired load data and ultrasonic frequency data and/or at least some of the information and/or data regarding the determined parameters, N, H1, H2, or P.

17. The method of claim 13, further including displaying at least some of the information and/or data regarding the acquired load data and ultrasonic frequency data and/or at least some of the information and/or data regarding the determined parameters, N, H1, H2, or P on a display.

18. The method of claim 13, further including:

altering a temperature of the bond in a prescribed fashion;

acquiring at least some temperature data for the ensemble system; and

assessing the strength of the bond based on the determined parameters, N, H1, H2, and P and the temperature data.

19. The method of claim 13, further including:

comparing the determined parameters, N, H1, H2, and P to determined parameters, N, H1, H2, and P from a prior test of a of a bond; and

assessing the strength of the bond based on the comparison of the determined parameters.

20. A method for determining at least some bond strength parameters for a bond of a bonded component, comprising:

coupling a phaselocker, via a transducer, to a bonded component to create an ensemble system;

acquiring at least some load data and ultrasonic frequency, initial conditions data for the ensemble system;

applying a load to the bonded component during a load period by placing the bond under tension or compression, thereby applying stress to the bond;

acquiring at least some load data and ultrasonic frequency data from the ensemble system during the load period;

maintaining the load on the bonded component during a load-hold period;

acquiring at least some load data and ultrasonic frequency data from the ensemble system during the load-hold period;

removing the load on the bonded component during an unload period;

acquiring at least some load data and ultrasonic frequency data from the ensemble system during the unload period;

acquiring at least some load data and ultrasonic frequency, final conditions data for the ensemble system after the load on the bonded component has been removed during a relaxation period;

determining a non-linearity parameter (N) from at least some of the acquired data;

determining a hysteresis parameter (H1) for the load-hold period from at least some of the acquired data;

determining a hysteresis parameter (H2) for the unload period from at least some of the acquired data;

determining a plasticity parameter (P) for the relaxation period from at least some of the acquired data.